INFORMATION PAPER

SUBJECT: Health Effects of Mold Exposure

1. BACKGROUND. Mold is another name for fungi when visibly present in the indoor environment. Mold has been in the news lately due to media interest and purported involvement of toxins produced by mold in cases of sick building syndrome. Many buildings have visible mold contamination, sometimes associated with symptom complaints from building inhabitants.

2. SOURCES OF MOLD EXPOSURE. The same fungal organisms that cause fuzzy or slimy discoloration on walls when the conditions promote mold growth are part of the normal indoor and outdoor environment. Normally indoor concentrations should be lower than those found outdoors, and visible mold is a sign of a moisture problem that needs to be addressed. Mold also contaminates our food supply (especially grains and nuts). When mold is visible, it can usually be assumed that there is a fungal allergen present. Spores released into the air by fungi contain the allergens. The amount of spores present depends on a variety of factors, including species reproductive cycles, environmental factors and physical factors (such as manually disturbing mold).

3. HEALTH EFFECTS.

a. Allergy exacerbation is the only significant and well-established risk from exposure to mold. All fungi probably produce allergens, but only a few of the hundreds of thousands of different kinds of fungi have been tested for allergenicity. It is estimated that fungal allergy is found in 10% of the general population and 40% of asthmatic patients.

(1) Allergic rhinitis is the most common allergic reaction to fungal allergens. It is often accompanied by itchy or irritated eyes or throat, and sneezing.

(2) Frequent bouts of sinusitis are common in mold allergy.

(3) Asthma is the most serious allergic condition caused by exposure to mold allergens. Some cases of new asthma associated with mold exposure at work meet the criteria (after diagnostic work-up) for occupational asthma, and epidemic asthma has been reported in buildings with mold contamination in air handling systems.

b. Hypersensitivity pneumonitis, an immune-mediated inflammatory reaction in the lungs, is an unusual but well-documented manifestation of sensitivity to fungus. Certain bacteria, especially the thermophilic actinomycetes, which are also often a problem under the same environmental conditions, can also cause hypersensitivity pneumonitis.

c. Fungal infections, including aspergillosis and invasive fungal sinusitis are rare consequences of exposure to mold, and typically only affect immunocompromised individuals.

d. Mycotoxins are toxic compounds made by many fungi as metabolic side products. Presence and amount of mycotoxins depends on species of fungus and a variety of growth factors. The detection of a toxigenic mold does not necessarily indicate the presence of mycotoxins. Mycotoxins are common in our grain-based food supply, and ingestion is the major source of exposure. Although mycotoxins have been considered as potential causes of the myriad non-allergic symptoms often found in patients with indoor air related complaints, research to date has been scant, and the issue remains controversial. Mycotoxins are considered relatively non-volatile and unlikely to be released into the air in sufficient quantities to cause disease. Currently, there are no environmental air sampling methods for detecting mycotoxins, nor are there any biomarkers to measure exposure to them. A variety of other compounds, including fungal glucans (with irritant effects like endotoxin) and volatile metabolic byproducts, are produced by fungi but there is no good evidence to date that these are the cause of non-allergic symptoms.

e. Building conditions related to mold overgrowth include ventilation and moisture problems, both of which are associated with symptoms of discomfort in building occupants.

4. DIAGNOSIS. History is the key to diagnosing fungal allergy. Contribution of the workplace should be assessed through questions regarding timing of symptoms in relation to work, symptoms on weekends and on vacation, symptoms when in other areas at work or on TDY. If there are symptoms or signs of asthma, a peak-flow meter with diary and instructions on using before, during and after work should be provided. Spirometry at the beginning and end of the workweek (e.g., Monday AM and Friday PM) can provide objective evidence of bronchospasm. Referral to an allergist may be indicated. Although testing for allergy to fungus does not provide definitive proof of this as the cause of symptoms (or of the workplace as the source of exposure) it can provide supportive evidence. In cases where symptoms suggest allergy, and visible mold is in the area where symptoms occur, it is not necessary to seek definitive proof through allergy testing before recommending building corrections to reduce mold exposure, since it is known that allergic individuals have a high rate of allergy to mold.

5. COLLABORATIVE APPROACH TO WORKPLACE EVALUATION. Teamwork with the installation industrial hygienist and facilities management in evaluating patient complaints relevant to the work area is critical to solving the problem. If symptoms suggest allergy to a substance in the work environment, a careful search for a source of this allergen should be made. Fungi are not the only source of allergens in the indoor environment. Many people are allergic to dust mites, insect parts, etc.

6. TREATMENT. Appropriate treatment of allergic symptoms due to exposure to fungal allergens includes removal of the source of allergy. This means abatement of visible mold where found, correction of water incursion problems, and searching the air handling systems in the work area to ensure that any mold is identified and removed. Allergic symptoms should otherwise be treated as for other allergies. Antihistamines often provide some relief while evaluation and abatement are under way. In cases of serious allergic conditions such as hypersensitivity pneumonitis and asthma suspected due to work exposure, removal from the work area pending abatement should be considered.

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